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Study of Strength Property of Concrete Using Waste Plastics and Steel Fiber

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----------**ABSTRACT**----------
The rapid Urbanization and Industrialization all over the world has resulted in large deposition of Plastic waste. This waste can be utilized under proper condition as content in Concrete. In this paper we study to the compressive strength of concrete using waste plastics and also add steel fiber with waste plastics. M-20 grade of concrete having mix proportion 1:1.66:3.33 with water cement ratio 0 .50 to study the compressive strength of concrete using waste plastics and waste plasti c + steel fiber. Concrete cubes of size 150mm x150mm x 150mm are prepared and tested for compressive strength after 7 and 28 days. A result data obtained has been analyzed and compared with a control specimen. A relationship between compressive strength vs. days represented graphically. Result data clearly shows percentage decrease in 7 and 28 days compressive strength.

KEYWORDS –*M-20 grade concrete, waste plastics, cubes, compressive strength test.*

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I. INTRODUCTION

This research paper seeks to optimize the benefits of using post consumed waste Plastics in concrete. The proposed concrete which is made up by adding plastic in concrete may help to reuse the plastics as one of the constituent's material of concrete. The post consumed waste plastic disposals of specific size and shape. And also have been using steel fibre to study what are improvement in strength Several design concrete mixes with different percentages of waste plastics pieces and steel fiber, are casted into desire shape and size as per requirement of the tests. Each specimen was cured for 7 and 28 days. The compression tests were carried out. The results are compared with control concrete.

II. LITERATURE REVIEW

Before this study to many research have been done. Now look what the results they have found Prabir Das (2004) has suggested that plastics can be used in construction industry at various places. Proper selection of material / grade and suitable design considerations can help to replace many more applications. Lighter weight, design flexibility, part integration, low system cost, very high productivity and improved product appearance are the main features for use of engineering plastics[1]. R.Lakshmi and S. Nagan suggested the use of E- Plastic particles along with fly ash to improve the properties of concrete [2]. Vasudevan (2004), in his report has given most useful ways of disposing waste plastics and laying roads have come to light in a research carried out by the Chemistry Department of Thiyagarajar College of Engineering. They have reported that the waste plastics may be used in block making modified light roofing, mastic flooring and polymer reinforced concrete. The blocks can take 350 tonnes of load and prevents water penetration. They can also be used in lining of canals.

III. MATERIAL SPECIFICATION

1. Cement-

The cement used in this experiment work is 43 grade of Ordinary Portland Cement as per IS:12269-1987. The specific gravity of the cement is 3.15.

2. Fine aggregate

Locally available sand passed through 4.75mm IS sieve is used. The specific gravity of 2.65 and fineness modulus of 2.62 are used as fine aggregate.

3. Coarse Aggregate

Crushed aggregate available from local sources with a maximum size of 20mm, and having the specific gravity value of 2.8 and the water absorption of 0.5% gas been used as coarse aggregate.

4. Water

Potable tap water is used for the experimention.

5. Waste Plastics

Disposal cup used as waste plastics.

6. Steel Fiber

Steel Fiber The length of fiber is 50mm and width of fiber is 0.5mm.

7. Batching , Mixing and casting

The coarse aggregate and fine aggregate were weighed first with an accurate of 0.5 grams. The Concrete mixture was prepared by hand mixing on a watertight plateform. Cement , the coarse and fine aggregates were mixed thoroughly. To this mixture, the required quantities of waste plastics (waste plastics 0.2% to 1.0% weight of cement) were added. These were mixed to uniform colour. Then water was added carefully so that no water wass lost during mixing. The moulds were filled with 0.2%, 0.4%, 0.6%, 0.8% and 1.0% waste plastics and vibration was given to the cube moulds using table vibration. The top surface of the specimen was leveled and finished. After 24 hours of mould preparation, specimen were transferred to curing tank where in they were allowed to cure for 7, 28 days.

IV. EXPERIMENTAL PROGRAM

1. Compressive strength test-

The compressive strength of concrete is one of most important properties of concrete in most structural applications. For compressive strength test , cube specimens of dimensions 150mm x150mm x150mm were cast for M-20 grade of concrete for only mix waste plastic and waste plus steel fibre . After curing, these cubes were tested on Compression Testing machine as per IS 516-1959. The failure load was noted. In each category three cubes were tested and their average value is calculated.

V. V RESULT & CONCLUSION

Compressive Strength that result after 7, 28 days of curing are given in table -1 & table-2 and further highlighted in figure-1& figure-2

TABLE-1

Waste plastic piece (disposal)

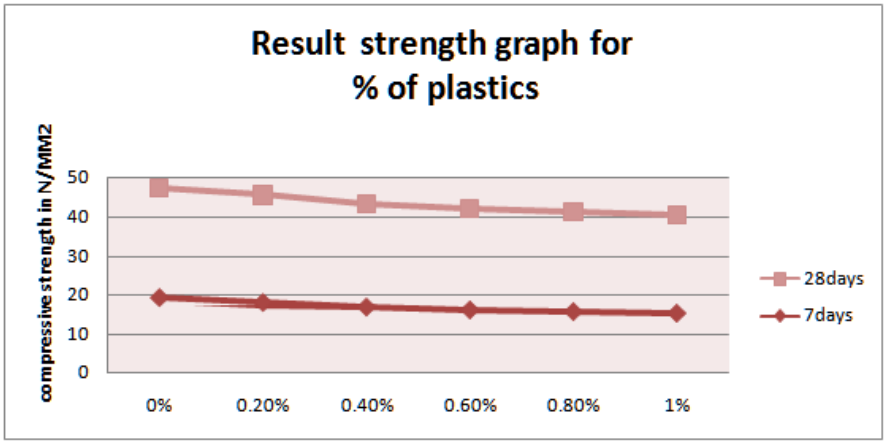
% of plastics	compressive strength in ton	
	7days	28days
0	43.7	63
0.2	40.7	62.1
0.4	38.00	59.6
0.6	36.3	58.7
0.8	35.3	57.7
1	34.3	57

TABLE-2

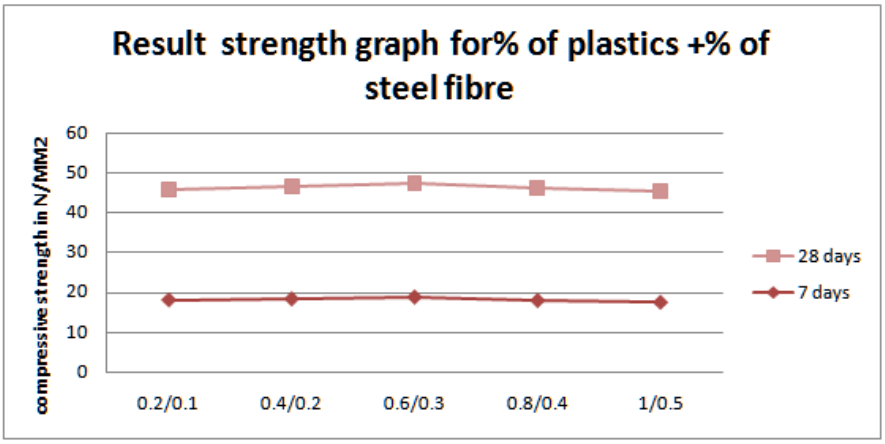
Waste plastics + steel fibre

% of plastics/% of steel	compressive strength in ton	
	7days	28days
0.2/0.1	41	62.7
0.4/0.2	41.7	63.3
0.6/0.3	42.6	64.7
0.8/0.4	40.7	63.7
1/0.5	39.7	62.7

Here we see that if we mix waste plastic then result shows lower compressive strength compare with control concrete, but we have achieved targeted compressive strength with .4% of waste plastic (disposal cup). Other thirty cube which casted with both steel fiber and waste plastic gave better result. Higher compressive strength with 0 .6% of waste plastic and 0.3% of steel fiber. Graph have drawn are given below.



GRAPH 1. CONCRETE MIX WITH WASTE PLASTIC



GRAPH 2 CONCRETE MIX WITH WASTE PLASTICS AND STEEL FIBER

CONCLUSION

The use of waste plastics in concrete is relatively a new development in the world of concrete technology and lot of research must go in this material is actively used in concrete construction. The use of plastics in concrete lowered the strength of resultant concrete, therefore. the research must be oriented towards systems that helps in overcoming this drawback of use of plastics in concrete.

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